
Book Reviews

The extinction of Charles Darwin

by Warren J. Hamerman

Vertebrate Paleontology and Evolution

by Robert L. Carroll
New York: W.H. Freeman and Company, 1988
698 pages, hardcover

Five Kingdoms: An Illustrated Guide to the Phyla of Life on Earth

by Lynn Margulis and Karlene V. Schwartz
New York: W.H. Freeman and Company, 1988
Second edition, 376 pages, paperback \$24.95

Vertebrates span more than the last 500 million years of life on Earth, and their history is recorded in a series of fossils. From fossils, we can determine the interrelationships of modern species, how they evolved, and where they are headed. *Vertebrate Paleontology* is the first fascinating, well-presented, and detailed review of fossil knowledge to be published in the last 20 years—a period in which entire new groups of jawless fish, sharks, amphibians, and dinosaurs have been discovered, and major “transitions” between amphibians and reptiles, reptiles and mammals, and dinosaurs and birds have been studied afresh with new techniques in paleontology and modern biology.

The author presents a cogent argument for the fact that the fossil record does not support the theories of Charles Darwin, and indeed never did so. In his 1859 *Origin of Species*, Darwin argued that the course of evolution resulted primarily from natural selection slowly acting on variations within populations without skips and jumps. Darwin believed this process was gradual and led to progressive change over time. After Darwin, the dogmas of Mendelian genetics to modern molecular genetics provide a so-called mechanism for gradual Darwinian natural selection through mutations.

In contrast to Darwin, over the past 15 years, several scientists have forcefully argued that fossil evidence shows that most common species retain a particular morphological pattern for millions of years without change. Then, change

occurs in a rapid jump, termed “punctuated equilibrium.” While Darwin downplayed the sudden bifurcation of a species into two, or “speciation,” modern scientists argue that there is little evidence for gradual changes within a species, but a lot of evidence for sudden speciation.

Author Carroll presents his own view that evolutionary rates are “irregular and opportunistic.” Especially for dramatic evolutionary events which involve both structural-functional changes in appearance along with new habitats, Darwin is decidedly wrong. Examples of such spectacular evolutionary singularities include the origin of amphibians, the origin of flight three distinct times—in bats among the mammals, and in birds and pterosaurs previously—and the origin of mammals themselves. Carroll’s book features more than 1,700 illustrations so that the reader can clearly visualize the transformations and transitions over time.

Five Kingdoms is a much more basic picture-and-text “catalogue” of the life forms on Earth. The authors also find it necessary to amend the basic kingdom taxonomy which Darwin knew. From Aristotle until the middle of this century, life was divided into a plant and animal kingdom. During the late 19th century, various scientists proposed separate third and fourth kingdoms for bacteria and fungi. The five-kingdom system advanced in this popularly presented handbook include: 1) Prokaryotes (bacteria), 2) Protocista (algae, protozoans, and slime molds), 3) Fungi (mushrooms, and lichens), 4) Animalia (animals with or without backbones), and 5) Plantae (mosses, ferns, cone-bearing plants, and flowering plants).

The book’s biggest debt is to the Life Sciences Division at the National Aeronautics and Space Administration, which supported the project. Before the Viking spacecraft Mars mission in 1975-76, the possibility of Martian life was being widely discussed. In this context, NASA scientists were concerned with the general lack of appreciation for the diversity of life on Earth, especially in the microbial world. This illustrated guide to life on Earth introduces the reader to his fellow species. Scientists estimate that there are at least 3 million, and perhaps 20 million species of living organisms on earth, and an even greater number that have become extinct.

Books Received

The Iowa Precinct Caucuses: The Making of a Media Event, by Hugh Winebrenner, Iowa State University Press, Ames, Iowa, 1987, \$15.95, hardbound, 173pp.

Diesel: Technology and Society in Industrial Germany, by Donald E. Thomas, Jr., The University of Alabama Press, University, Ala., 1987, \$26.95 hardbound, 279pp.